

## Light transport in complex photonic systems

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We will give an overview of various light transport phenomena in one dimensional photonic structures, focusing on ordered structures in which the periodicity is broken.

Fibonacci quasi-crystals are non periodic deterministic systems that present long range correlations. We investigate, using time-resolved transmission experiments, their rich fractal structure. The transmission spectrum exhibits narrow peaks associated to localized modes, alternated with forbidden frequency regions or bandgaps [1].

Also we will report on periodic structures in which a linear gradient is imposed on the refractive index. This constitutes the optical analogue of an electronic crystal on which a static electric field is applied. The refractive index gradient mimics the static electric field and allows to study two well-known electron transport phenomena, Bloch oscillations [2] and Zener tunneling [3], for optical waves. We report on the experimental and numerical study of these effects in optical superlattice structures.

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